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UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

BRANCH OF RESEARCH

MONTHLY REPORT

OF

FOREST EXPERIMENT STATIONS

FOREST PRODUCTS

FOREST ECONOMICS

RANGE RESEARCH

MAR 1931



BRANCH OF RESEARCH

March, 1931

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FOREST EXPERIMENT STATIONS

ALLEGHENY FOREST EXPERIMENT STATION

General

The orderly analysis of field data and preparation of reports covering this analysis has been badly interrupted by emergency jobs, in which almost the entire staff has participated.

The contract has been let for the drilling of a well on the Kane Experimental Forest, and Wood has about completed the plans for the laboratory building and the resident manager's house there. Mr. Everett Haines of Medford, New Jersey, one of the directors of Camp Ockanickon, very generously spent considerable time going over the proposed plans for the laboratory, and his report allayed our apprehensions lest we had planned too large a building to be built for \$2,500. A satisfactory design for the resident superintendent's house has been obtained from a catalogue of house design. Hough made a special trip to Kane, and in spite of the presence of two feet of snow on the ground was able to stake out our building site, and push the plans for drilling the well. Unfortunately the cost of obtaining electric current commercially has proved prohibitive, owing to the distance of the camp site from the nearest transmission line, so that we shall be obliged to generate our own electricity; gas, however, will be readily obtainable.

The second emergency job - the revision of the Capper Report figures for Pennsylvania and New Jersey - involves the critical use of a very substantial volume of information already compiled by the States. Pennsylvania, for example, about five years ago classified all the forest lands of the State into categories which can be fairly easily related to those required in the extensive revision. Fortunately it will be necessary for us to recognize only three types in the two states assigned to us. Forbes has been obliged to call upon all members of the staff for assistance.

Another emergency job, requiring the presence of Hough at Warren for a day, has been the appraisal of the lot on East Tionesta Creek which we had tentatively agreed was the most desirable for purchase as a research reserve. Very fortunately for us, Mr. James Girard was available to make this appraisal.

Forbes profited by attendance on the annual meeting in New York of the Directors of the Northeastern Experiment Stations. This meeting appealed to him as a model for the open and frank discussion of common problems by a body of men who realize that vegetation recognizes no political boundary. The meeting showed a lot of interest in Director Behre's report as referee on forestry.

(Over)

Hatch lectured on the mycorrhiza of forest trees before the graduate botanical club of the University. We have been able to furnish the botany department of the University with some class-room material, also with records of soil temperatures at Camp Ockanickon, for which there was a request. The number of students seeking information on forestry, or the use of our library, is increasing.

Forestation

Wood and Clapp set the cedar stakes to mark the seedlings in this year's plantations at Camp Ockanickon. This year's planting of conifers will be supplemented by the use of a few hundred chestnut oak seedlings raised at the Camp in other experiments.

Mensuration

Schnur completed the rough draft of two articles on mine prop volume tables, one for popular use, the other for the Journal of Agricultural Research. The first is the joint effort of Schnur and Mr. McIntyre of Pennsylvania State College.

Types

While not occupied with the plans for the Kane Experimental Forest, Hough continued the analysis of his data for the virgin tract on the East Tionesta Creek. Morey has practically completed the analysis of data on height, age, and diameter at Heart's Content, and has begun work on a manuscript summarizing his findings. As a preliminary to the latter he has reviewed about 28 articles, in the Journal of Forestry and elsewhere, on the northern hardwood and oak types.

Special - mycorrhiza

Hatch has about completed the working plan for the mycorrhiza study, and spent a day with Dr. Livingston at Johns Hopkins discussing methods. He has also been making some cultures from old material, sectioning and otherwise preparing other material for microscopic study.

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APPALACHIAN FOREST EXPERIMENT STATION

General

Extensive revision and the annual report took much of the Director's time during March. W. H. Gibbons visited the Station to discuss plans of

operation in gathering data for the extensive revision. In connection with this project MacKinney and Abell made a week's tour in South Carolina to get data on the general location of the major forest types. They also interviewed a number of lumbermen and foresters obtaining from them considerable pertinent information.

F. C. Craighead and R. A. St. George, from the Bureau of Entomology, spent a week at the Station and the Bent Creek Experimental forest. The condition of projects already started in forest insect investigations was ascertained and plans for future work were discussed.

Another visitor was Edward R. Linn, field representative of the Appalachian Hardwood Club. Mr. Linn feels quite strongly that the Forest Service attitude toward the chestnut blight has worked a hardship upon timber operators in the Appalachians. He feels that, through the medium of numerous publications, too much emphasis has been placed upon the unavoidable extinction of the species and not enough attention given to the possible means of salvaging and utilizing the remaining chestnut. According to Mr. Linn, many architects have not specified chestnut in building plans for many years due to their belief that no good quality material could be obtained. He expressed appreciation of recent work done by the Forest Products Laboratory in getting out data to counteract this tendency.

Under the good-natured tutelage of Field Assistant G. A. Genth, two German classes have been organized for the staff members. Classes meet once a week, one evening being devoted to the beginners with special emphasis placed on the reading of German. The class for the more advanced members is concerned largely with conversational German. Practically the entire staff is taking part.

Bent Creek Experimental Forest

The Asheville Community Woodyard completed its operations on the forest under Buel's supervision, on March 30. A total of 828 cords of wood were cut between the middle of December and the last of March. An additional 100 cords were cut by a farmer living near the forest, and about 25 cords have been given, under free use permit, to families in the Bent Creek Valley.

A summary of this winter's cutting on the forest follows:

Units j-2 and k-2 were marked for cutting during the month. On unit j-2 there are several large yellow poplar seed trees and some pole size reproduction. Here an effort will be made to increase the amount of that species. Unit k-2 is a chestnut oak site and seed trees and young thrifty trees of that species were left.

Under the direction of Hursh, roads have been completed on the site of the new laboratories and buildings on the Bent Creek experimental

forest. These roadways have been heavily sanded to facilitate hauling of building materials. After the hauling is finished a surface of crushed stone will be placed over the sand.

Specifications and plans for the buildings have been completed. Three laboratories, a caretaker's house, a bunk house, and one greenhouse will be erected. A sewage system will be constructed, also water system with fire hydrants.

The buildings will be of semi-fire proof construction, with field stone foundations and split shingle sidings.

Forest Management in North Georgia

The preliminary draft of a semi-popular bulletin entitled "The Mountain Forests of Northern Georgia" was nearly completed by Barrett. This deals largely with the growth of virgin forest areas. A comparison of the average annual board foot increment for the past 20 years showed the virgin forests to have grown at the rate of 2.5 per cent as against 9.0 per cent for well-stocked cut-over slopes. This represented an annual production of 81 and 89 board feet per acre, respectively.

Abell prepared a manuscript describing the inadequacy of forest types as a basis for classifying mountain hardwood stands with regard to major silvicultural needs. The forests have been modified by man, fire, and livestock for such a long period that features of the stand other than the floristic appear to be primary in importance. This situation has not been adequately met by the forest type concept. A system of classifying stands on the basis of forest conditions within general types was proposed.

Selective Logging in Loblolly Pine

MacKinney spent a portion of the month reviewing the report on "Selective Logging in Loblolly Pine-Hardwood Forests, with Special Reference to Virginia", which was prepared in cooperation with the Forest Products Laboratory. This report will be published by the Virginia State Forest Service. Data on costs of logging and milling, which are included in the report, show for operations similar to the one studied, that loblolly pine trees under thirteen inches in diameter breast high, and hardwood trees under fourteen inches in diameter breast high, cannot be made into lumber at a profit.

A special memorandum dealing with the establishment of permanent sample plots on the area logged selectively was nearly completed. This showed that an average per acre of five pines in the 4-11 inch diameter classes and 13 hardwoods in the 3-14 inch classes were damaged beyond recovery. The hardwoods were all undesirable and would have been removed under silvicultural improvement. Had the pines not been damaged beyond recovery they would have comprised only 8 per cent of the total number of trees in the residual stand. Logging damage to the remaining pine stand of 60 trees per acre was slight and only 5 per cent of the trees were injured.

Logging damage to reproduction (under 2.6 inches d.b.h.) amounted to 81 per cent of the pine and 57 per cent of the hardwood destroyed or damaged beyond recovery. Even with this heavy loss the remaining reproduction consisted of 852 pines and 9,120 hardwood stems per acre.

Fire studies

Computations pertaining to the basal damage study by Sims and Nelson were completed during the month. Analysis to date indicates that the greatest correlation between area of wound and external discoloration, burning, charring or scorching of the bark is found in chestnut oak and the least in scarlet oak. Another outstanding fact noted during the analysis was that diameter in scarlet oak has practically no effect on the size of the wound. In other words immunity to fire does not increase with size in this species.

On March 26 and 27 Hursh attended a conference at Starke, Fla. on plans for fire damage studies with particular reference to forest soils and physical damage to trees in connection with the naval stores industry. The problem was much in common with the fire damage studies that have been in progress at the Appalachian Station for two years, particularly the problem of defoliation as related to the growth and vigor of the tree. The recognition and the classification of humus types of the soil profile is a subject pertinent to both regions, particularly the changes in the humus type that accompany changes in the vegetative type. It appears that this subject is even more difficult to approach in the southern pine lands because of significant changes in the vegetative cover that are brought about through repeated fires.

Test of species

A report and criticism by Sims of the water requirements study carried on at Bent Creek last summer was completed. The experiment was intended to ascertain the water requirements of yellow poplar and chestnut oak in cove soil and in ridge soil by the sealed potometer method. The death of 21 out of the 24 trees observed, however, rendered the experiment a failure.

Examination of the data and records revealed two main reasons for the death of the trees; first; the trees were wildlings transplanted to the potometers while in full leaf, and second, two periods of extremely hot, dry weather during July and August, which overtaxed the ability of the root systems to supply water for transpiration. The root systems were evidently severely injured during the transplanting, even though a large ball of earth was kept intact around the roots.

Last summer's experience indicates that the procedure should be modified so as to start the plants from seed in small potometers. With

increase in size they can be transplanted to larger potometers. This would eliminate the severe disturbance of the root system occasioned by transplanting wildlings or nursery stock.

Pathology

In addition to routine laboratory work, Nelson prepared a memorandum on the decay of Trametes pini found in loblolly pine at Franklin, Va. The trees were located on the Hedgepeth Tract, which was cut over during the study of selective logging in loblolly pine-hardwood forests. It was found that the presence of "punks" or fruiting bodies on the boles was the only infallible sign of red heart within the tree. Eleven per cent of the total number of trees cut on the tract contained red heart. The greatest length of rot below a fruiting body was found to be 35 feet and the greatest length above was 55 feet, the average total length of rot being 50 feet.

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CALIFORNIA FOREST EXPERIMENT STATION

General

March was pretty heavily filled up with meetings, particularly in respect to the Director's time.

On March 2-4 inclusive occurred the meeting of the Regional Investigative Committee. Forty-nine persons were in attendance for all or portions of the 3-day meeting, representing 12 separate organizations reporting on investigative activities. The expression of the attendants was unanimously that this meeting was both the most interesting and the most fruitful of any Investigative meeting ever held in this region.

From March 9 to 18 was held the Regional Supervisors' meeting in San Francisco, requiring the practically continuous attendance of Kotok and some time of a few Station project leaders. Following this Kotok left for the annual meeting of the Western Forestry and Conservation Assn. at Spokane, held on March 19-21; at which he presented a paper. On March 27 was held a meeting of the lumbermen's White Fir Committee, which was attended by Kotok and Brundage, as well as by the Regional Forester and members of the Office of Forest Management.

Occupying the last days of the month was the beginning of the Regional Fire Training Conference, held at the University of California, Division of Forestry and participated in by Kotok and the Fire personnel of the Station, as well as by several members of the RO, and attended by Asst. Supervisors and fire chiefs of all the Forests of the Region.

Visitors during the month included F. I. Richter, formerly of the Southern Station and the Orient, now connected with the Eddy Tree Breeding Station at Placerville, Calif.; and N. V. Kanitkar, soil physicist, British Indian Dept. of Agriculture, Bombay, who consulted with Dr. Lowdermilk on soil moisture and erosion studies.

Management

Tabulation of measurements in the Mc study came to a halt March 31 - not quite finished, but more nearly so than we expected. Three new plots remain to be tabulated. Agri left for the Pacific Northwest Station March 30, and Gibbs starts out in the field on the redwood study April 1. Hasel and Clements will continue progress reports until late spring.

Some interesting results were obtained from a virgin timber plot on the Stanislaus for the 5-year period 1923 to 1928. The area is about 6 acres. Site I. Type sugar pine-white fir. The stand in 1923 averaged 78 trees per acre 4" and over, 253 sq. ft., basal area, 15187 cu. ft., and 81980 bd. ft. (Scribner). Of the board foot volume 20 per cent was WYP 30 per cent SP, 47 per cent WF, and 3 per cent IC.

In this stand there was a net loss on an acre-year basis of 0.25 trees, 3.9 sq. ft., 129 cu. ft., and 728 bd. ft.

Of the total loss in board feet 37 per cent was caused by wind and 63 per cent was caused by insects. Of this loss, 69 per cent was in WF, nearly all caused by insects, and 31 per cent was in WYP and SP, all caused by wind. Incense cedar made a slight ^{net} gain.

The growth rate of surviving trees was slow. In basal area the annual rate was 0.66 per cent, in cubic feet 0.71 per cent, and in board feet 0.70 per cent. Corresponding rates on adjoining cut-over land were, basal area 2.54 per cent, cubic feet 2.71 per cent and board feet 3.68 per cent.

Reineke is continuing the statistical analysis of Mr quadrats. It appears that the nearly 2000 quadrats we are charting annually is not too many, as we hoped, but not enough to give a fair degree of representation of major areas, or of the variables to be compared. Since we have reached the elastic limit in number that can be carried, we will probably have to restrict our efforts to fewer variables rather than to establish more plots. There is some indication that transects are not as desirable as uniform sampling of the larger areas.

Lloyd will continue planimetering maps for Reineke's study.

At odd moments Reineke is playing with a promising idea for determining soil moisture relations through the season for soil in place. If his hunch works out into a workable and valid method it will constitute one of the most helpful aids to soil studies that could be made.

Redwood Investigations

Besides the considerable time given to the Investigative Committee meeting, and the Regional Supervisors' meeting, Person spent most of the month assisting Hammatt on the redwood section of the Capper Report revision. The only other activity was planning a field study of redwood planted areas, which will be carried out in April.

Forestation

Of unique interest in the field of planting was the visit of Knowles Ryerson, Chief of the Office of Foreign Plant Introduction, with whom was discussed the need in southern California of non-inflammable drought-enduring plants for use in firebreak planting. Plans were made for having the Department's agricultural explorers instructed to keep on the lookout for such plants in foreign countries.

At Devil Canyon Nursery transplanting and plotting of all seedling stock was completed, with the exception of small lots of Coulter pine held over for transplanting in April and May in connection with a season-of-transplanting experiment begun in January. Transplants in open ground numbered 33,000, in pots 2,500, and about half the seedbeds were completed by the end of the month.

Again the uncertainty of southern California weather has disturbed planting plans. Precipitation during March was limited to a catch of .09 inches from a heavy fog on the 4th and .41 inches from a short downpour on the 24th. With temperatures above 80° for five days, above 60° for 24 days, almost constant sunshine, and considerable daily wind, the month was decidedly unfavorable for planting.

Twenty-five visitors registered at the nursery during the month, notable among them being Maj. John Guthrie who spent three days with Kraebel on a general examination of the Station's work in the south. Of special interest to Major Guthrie were the present-day results of the planting effort of 1905-8, because of the part he took in selecting many of the ranger-nursery sites during that period.

Preparations are in progress for the erection at Devil Canyon of several much needed buildings. These include a plotting shed, combination workshop-storeroom-garage, a small laboratory and instrument room, sleeping and mess accommodations for Station staff men, and a small cabin for the permanent nursery laborer.

At Feather River the last of the transplant stock was shipped to the forests; transplant and seedbed areas were prepared for these operations to be done in early April. A quantity of sugar pine seed was placed in moist sand in cold storage for sowing during April, with

a view to testing the efficacy of this method of stimulating more even germination, reported to be successful with eastern white pine.

Erosion Control Experiment

Unexpected and unsolicited publicity which was given our very modest experiment in control of erosion from new road fills on the Waterman Canyon road in the San Bernardino Forest, brought a harvest of criticism upon the local officer of the State Highway Department. Inspired by the newspaper article, owners of land affected by erosion debris from the road threaten legal action to recover alleged damages from the Highway Department. In consequence of this development, the highway officials have gone to considerable lengths in improving drainage systems for road-surface run-off and in constructing check dams in stream channels below the road, in the effort to reduce erosion and prevent further deposition of debris on the lower lands.

Studies by the engineers, of the previously deposited materials, are claimed to prove that these deposits are beneficial rather than harmful. The studies are said to show that the erosion deposits, having come from deep road cuts, are mostly of unweathered material containing a much larger percentage of coarse particles than fines. Therefore, it is claimed that these deposits, when accumulated in stream channels, act, sponge-like, to conserve water and thus to maintain a longer and steadier flow than the streams had yielded previously. Similarly, the addition of such porous material to the water spreading grounds is claimed to increase the water receptivity and storage capacity of these grounds. As evidence that road-erosion debris is not in the harmful category of debris from burned areas, the engineers submit that the latter is composed of ash, organic matter and fine surface soil which, it is claimed, are especially effective in sealing spreading ground surfaces. These findings have been accumulated in anticipation of damage suits and are believed by the engineers to be sustainable in court.

It is perhaps unfortunate that such a situation should have been precipitated by a simple experiment, but the improvements in drainage and erosion control along the road are at least a tangible benefit.

Forest Influences and Erosion

The month of March has been taken up with plans and beginning of construction of experimental installations made possible by Emergency Employment funds. Plans were drawn for large brush lysimeters to be located in Strawberry Canyon near Berkeley. The lysimeters are to be installed in two units of 5 compartments each. Each compartment will have a projectional area of 80 square feet and a depth of 4 feet of soil. Each unit will therefore have a projectional area of 400 square feet, and

include a total volume of 1600 cubic feet of soil for each unit. The units will be sunk into the soil of a slope giving a lysimeter surface gradient of $27\frac{1}{2}$ per cent. Provision will be made to plant native chaparral species within and surrounding the lysimeters. The collector tanks will be removed at least 20 feet from the lysimeters. The lysimeters will be constructed of steel plate welded in place and set on a concrete foundation.

The major object of the experiment is to measure the role of a mantle of chaparral vegetation on the yield of water below a four foot level of soil. Treatment of the vegetation may be carried out to ascertain differences in yield, where all factors are measured. One unit of tanks will be devoted chiefly to the study of the role of graminaceous vegetation. Provision will be made at a later time for subjecting the tanks to artificial rain, to determine the role of the vegetation under heavy and light rainfall.

Work has been started on the installation.

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In response to an invitation by the Conservation Committee of the Farm Bureau of Ventura County to accompany the committee into the back country at the solicitation of a group of cattlemen and others, Dr. Lowdermilk took the opportunity to hear first-hand the arguments for burning the chaparral forests to increase water supply. The visiting committee was well entertained and horses were furnished for the long trail rides. The ace card of the demonstration was a spring which was alleged to have come into existence following the cutting of about 2 acres of willow canyon bottom vegetation on alluvial land below the spring, which obviously issued from the base of a long slope. The point of the argument, however, lost its force when it was pointed out to the ranchers that the willows were in winter dormant condition, not having yet swelled their buds on the uncut trees, at that elevation. It was not, therefore, probable that the occurrence of the spring had been occasioned by any reduction in transpiration losses. At the time of the visit nights were frosty, and the thermometer registered 32° F. at 7 a.m.

The need was stressed for experimental determinations of the role which vegetation actually plays in the yield of water from California watersheds where water supplies are critical.

Fire

The Regional Investigative Committee Meeting, Supervisors' Meeting and the Regional Fire Training Conference, occupied about a week's time for the fire force.

Work was continued on the study of visibility and progress made toward crystallizing the methods and technique of evaluating lookout points after having the visibility maps to work with.

An analysis was made of the action of the fire suppression crew on the Shasta Forest. The chief value obtained was the determination of additional data which should appear on the suppression crew form. As a result a proposed revision was made. Several additional fire forms were revised and several new forms were worked out. The latter included a form for recording the use of water in suppression and mopping up and a form which will serve for the collection of data on smoke and haze conditions at different times in different quadrants.

Products

Woods and Mill study

Now that the preliminary report of the Stanislaus project has served its immediate purpose, the long, hard grind of complete re-computation is under way. This time, instead of applying selling values to lumber grade volumes exactly as tallied and then smoothing off the resultant average log and tree values with curves, the grades themselves are being curved. Someone may have worked out a method par excellence for doing this job which is both simple and accurate, but if so the method has not been published - at least nothing could be found in the files pertaining to this particular problem. After trying out a half dozen systems, the one finally adopted, after consultation with Reineke and a series of experimental variations in application by Sanford, is as follows:

(Method of curving lumber grades produced from logs of different grades and sizes.)

1. Compute factors representing the number of 16-foot logs in each diameter sample.
2. Divide total footage of each grade of lumber cut from each diameter by the factor so found.
3. Plot these actual board foot volumes on semi-log paper (3 cycle used here) using a separate sheet for each grade of lumber. The vertical scale (board feet) can be varied to suit the grade volume produced, i.e., the base may be 0.1 foot, 1 foot or 10 feet.
4. Sketch in trial curve and adjust by a running balance between plus and minus sample points.
5. Read board foot volumes from each grade curve at 4-inch intervals (horizontal coordinate), compute percentages, plot latter on ordinary coordinate paper and draw curves through points.
6. Compute percentages of thicknesses produced within each grade by 5 to 10 inch diameter groups. Plot over middle point of each group on grade percentage curves and draw in thickness curves.

Widths within each thickness will not be carried through in the final computations because such refinement is too big a job for the small computing force available and would be far too cumbersome for application in appraisals.

The first curve to be plotted on semi-log paper will be that for total volume of 5 Common & Btr. in the average 16-foot log of each sample. The sum of the individual grade volume curve points for any diameter should then be approximately equal to the curved aggregate 5 Common & Btr. point for the same diameter. Errors may be readily detected by this check.

In the Stanislaus study there are four log grades each in western yellow pine and sugar pine and each log grade has 14 different grades of lumber. In fir and cedar there are three log grades each. Eleven grades of lumber were tallied for white fir and nine grades for cedar. This means 62 separately balanced volume curves and 48 separate percentage curves. Seasoning depreciation and remanufacture should be handled on a lumber grade basis also, working from the curved green grades in accordance with the detailed depreciation study data showing the final distribution of each original grade after trimming and ripping, but this method runs into such a mountain of figures that it will probably be necessary to devise some other scheme which will give reasonable accuracy with a minimum of computations. If anyone who has made a detailed depreciation study elsewhere (in which green grades are correlated with the final grades delivered to the car door) has worked out any kind of a short cut system for showing the changes between green chain and shipping platform in some form other than values in dollars and cents, we will appreciate a little advice. A "degrade factor" was devised which may solve the problem. This was explained in a previous issue of the monthly report. Other workers in the field may have something better, however, and if so we would like to know about it, especially if it will economize on time.

In the preliminary report of the Stanislaus study, final values of each green grade were computed directly. The technique of this method is to prepare a table for each grade and thickness (also width in the preliminary report) of green lumber showing its final distribution by shipping grades after seasoning, trimming and ripping, and surfacing. The published selling prices were then applied to this final distribution and the weighted values added up to give the end return from a thousand feet of any grade and thickness as tallied in the sawmill. It is a simple matter, of course, to work out the percentage value depreciation for any grade by dividing the theoretical value before depreciation by the actual value after depreciation. For example, if a thousand feet of green C & Btr. fir can be assumed to be worth the average 1929 value of \$39.35, and the depreciation study shows the same thousand feet to be worth only \$32.00 (i.e., what is left of it after trimming and ripping) the per cent of value depreciation is 81.3%. Such factor would be fine for application in appraisals if the rise or fall of lumber prices from one year to another followed a consistent relationship as between grades.

Consulting Entomologist

A survey of the control work which was carried on during the past winter on the Idyllwild and Corte Madera areas in southern California was made by K. A. Salman and L. G. Baumhofer, March 5-11. The projects were carried on largely on private lands, but with the cooperation of the Forest Service where adjoining federal lands were infested. The overwintering trees of the western pine beetle had been felled and the bark burned at the time the examination was made. The work on the Corte Madera tract, a small but completely isolated private area, had been very thoroughly carried out.

Western pine beetle control was started on the Sequoia National Park March 6. Two camps have now been established, and it is expected that control work in three tributary watersheds of the Kaweah River will be completed by May 1. Supt. White and Mr. Coffman of the National Park Service were at the Berkeley Station on March 6 to make final plans with the Bureau of Entomology for the execution of this project. Albert Wagner was assigned by the Bureau to direct the training of the control crews in spotting methods and treatment of trees.

The Yosemite National Park started its control program in the yellow pine belt on March 16. In an inspection of this area on March 14 and 15 Dr. Salman found that an increase of the western pine beetle had developed late in the fall of 1930 on national forest lands adjoining the park boundaries. This condition threatens the Tiawona Road screen, a strip of timber sheltering the road through the part from the adjacent cutover lands. Conditions were found to be similar to those on other areas of the Southern Sierra region where epidemics have recently developed. An allotment was promptly made by the Forest Service to carry on control work in conjunction with that within the National Park. Mr. Baumhofer and Dr. Salman will assist in the carrying-out of this project.

J. A. Beal has completed his report on studies of insects developing in logging operations in western yellow pine. This study was based upon tractor logging on the Weyerhaeuser operation near Klamath Falls.

A report covering the 1930 season's experimental work on the fir engraver beetle (*Scolytus ventralis*) was completed by G. R. Struble during the past month. The report includes a study of losses in white fir, the life history of S. ventralis, and studies on a fungus associated with S.v. work. Experimental work in the laboratory on high temperatures as they affect S.v. larvae show that their lethal point is about 5° higher than that for D. brevicomis larvae. Tests run on the development of S.v. larvae at constant temperatures show a wider range of development than for the larvae of D. brevicomis.

CENTRAL STATES FOREST EXPERIMENT STATION

General

The staff of the Station completed its work for the spring term in the last of a series of lectures delivered before the Forestry classes of the Ohio State University. Two members of the Station also took part in the presentation of a short course given for the benefit of timberland owners of the state. Ralph K. Day and L. F. Kellogg prepared material for this short course. Kellogg's part of this program was presented by McCarthy since Kellogg was absent in Washington on project work of his own.

McCarthy attended the twentieth anniversary of the organization of the New York State College of Forestry at Syracuse and spoke before the student body in their convocation period at the college and again at their banquet. This invitation to appear at the banquet celebration came as a result of McCarthy's previous connection with the New York State College of Forestry, where he was employed in 1911 as the first forestry-trained instructor in the new college. This college now has an enrollment of three hundred and eighty students and has an excellent equipment in buildings, apparatus, and field stations. McCarthy then went to Washington to confer with the staff of the Branch in regard to the Station program and publication of a bulletin on yellow poplar.

All time available to members of the staff outside of necessary routine work was occupied in collection of statistics for a revised statement of timber acreage, stand, growth, and drain in the states of Ohio, Indiana, Illinois and Iowa. Work of this nature for the states of Kentucky, Missouri and Tennessee is being conducted under the supervision of E. M. Bruner at Louisville, Kentucky.

In connection with Day's trip to Purdue, he delivered two lectures before the forestry student body of that institution, discussing the work of the Forest Experiment Station and new developments in forest measurements.

Plantation Study (Tp-1)

Kellogg continued his work on walnut with the aid of the Computing Section in Washington. In the early part of the month the Scribner volume table to a 10 inch top for plantation black walnut was finished by him. The other four tables were prepared by the Office of Forest Measurements. Following is a statement of the basis for these tables:

<u>Table</u>	<u>Unit</u>	<u>Basis</u> Trees	<u>Aggreg.</u> <u>Diff.</u> Per cent	Av. Percentage <u>Derivation</u> Per cent	
Total volume	Cu. Ft. Entire Stem	400	-0.49	± 5.1	1/
Merchantable Volume	Cu. Ft. to a 4" top	345	+0.27	± 5.4	2/
International 1/8"	Bd. Ft. to a 5" top	256	-0.5	± 8.49	3/
Scribner	Bd. Ft. to an 8" top	153	-1.29	± 11.8	4/
Scribner	Bd. Ft. to a 10" top	90	-0.11	± 12.0	5/

1/	1.0 inch o.b. and up
2/	5.0 inch o.b. and up on 326 trees
3/	7.0 inch o.b. and up on 215 trees
4/	10.0 inch i.b. and up on 125 trees
5/	12.0 inch i.b. and up on 61 trees

In this study of yield for this species, the tabulation of data for 204 plots was completed and checked. These data were then punched on 3012 cards and the work verified. From the punch card totals, average curves for the basic yield tables of the study are being prepared. A site index has been assigned to each plot at age 50 years. These have been found to spread from 35 feet to 34 feet at that age.

Preliminary tests on seven Indiana plots have indicated that the distribution of diameters in these plantations is such that stand tables may be constructed for them. The relative numbers of trees in diameter classes is ragged and irregular, probably because of the influence of grazing and cutting. It is hoped that modification of stands has not been so great as to render them useless for the preparation of stand tables.

Kellogg's work promises success in preparation of a yield table for black walnut which will be unique in furnishing the first yield table for planted stands prepared in this country.

Woodland Grazing Study (Pa-1)

Reconstruction Phase

The manuscript covering the study of the classified woodlands of Indiana occupied most of Day's time during the month. The bulletin is now in preliminary form and as a result of a conference with DenUyl at Purdue, it is expected that the final draft will be ready June 1. The plans for the coming field season contemplate the permanent establishment of a number of the semi-permanent plots which were located last summer. A two man party, with close supervision from both Day and DenUyl, will endeavor to establish these plots. The purpose of these permanent plots will be to follow, for a period of years, the process of natural rehabilitation on a number of woodlands which have been released from grazing.

Growth and Yield Phase

Several "paired" areas have been located during the last year or two which affords very desirable locations for permanent sample plot studies for determination of the effect of grazing on the growth and yield of the woodland beyond the reproduction stage. These plots will be located and established during the coming summer in connection with other plots under the reconstruction phase.

Livestock Management Phase

While at Purdue University, Day and DenUyl visited the Pinney-Purdue Farm near Valparaiso for the purpose of completing details regarding the initiation on May 1 of the carrying capacity study. A boundary survey of the entire woodlot was made and the tract divided into three areas of six, twelve and eighteen acres each and the fence lines, gates, and water development were located on the ground.

Day expects to return to the farm about April 20 to establish certain quadrats prior to the initiation of the study. These quadrats will be for the purpose of following the utilization of forage, injury to reproduction and other effects which can be measured by quantitative means. Professor King of the Animal Husbandry Department of the Purdue Agricultural Experiment Station will superintend the selection of the animals for the experiment. He plans on securing nine head of yearling steers of uniform breed and type, buying them from the Chicago market and reselling them at the end of the season. These animals will be weighed at the start of the experiment and at least once a month thereafter until November 1, when they will be removed. Three successive weighings, of not less than one week apart, showing no gain or a loss for all three animals in any one tract, will be considered sufficient to prove the inability of that particular tract to support the cattle and they will be removed.

As planned, the experiment will be carried on during the six months grazing season from May 1 to October 31 and will run for at least three years and possibly five.

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INTERMOUNTAIN FOREST & RANGE EXPERIMENT STATION

General

Charles A. Connaughton, junior forester, was transferred in early March from Region 4 to the Station. He was assigned as assistant to Watts in Forest Management.

C. K. Pearse returned to the Station on April 1 after spending the

winter at the University of Chicago.

F. G. Renner returned from Washington on March 30 where he had spent the past three months completing his range bibliography and analyzing on the card machine the range-erosion survey data that were obtained during the field seasons of 1929 and 1930 on the Boise River watershed.

Management

Scribner completed during March the coding and checking of the fire data for the eight Idaho forests for the period 1921 to 1930 inclusive. He also assembled a table of tree measurements which included diameter, height and the actual volume in cubic feet for western yellow pine in southern Idaho. The object of the study is to compare the tabular volumes with that worked up by Meyer of the Pacific N. W. Forest Experiment Station for western yellow pine of that region in order to determine the adaptability of his table to the Idaho western yellow pine Mc and Me sample plots.

Influences

Field Season Starts

Watts and Connaughton left on March 16 for McCall, Idaho, to secure measurements on the snow recession plots that were established in 1930. It is planned to obtain the rate of snow melting on various cover plots as well as measure the various factors that influence the melting of snow.

Renner and Pearse left on April 3 for Boise, Idaho, to begin the snow surveys on the Boise River watershed.

Outlook for Summer Irrigation Water Not Good

Snow measurements made the first of April on the various watersheds in Utah show a very light snow cover with a greatly deficient water content. Measurements made at the Great Basin Branch Station in April show that the average snow depth was less than in any other year of a six-year period and was 30 per cent below the average. The water content was even more deficient and was 53 per cent below the six-year average.

Range Research

Nelson made a trip to Ephraim, Utah, on March 10-12, where he made sowings in the oak brush zone on top of the snow of yellow flowered sweet clover (Melilotus sp.), crested wheatgrass (Agropyron cristatum), common brome (Bromus inermis) and many flowered brome (Bromus polyanthus).

Biological Investigations

Locke spent from March 15 to April 4 on deer studies on the Middle Fork deer range of the Challis N. F. He also secured moving pictures of antelope on their winter feeding range on the Lemhi N. F.

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LAKE STATES FOREST EXPERIMENT STATION

The Station's staff was increased during the month by the transfers of F. H. Eyre, Silviculturist, and C. M. Aldous, Assistant Biologist. Eyre, who comes to us from the Washington office, will have charge of the work in connection with the proposed experimental unit on the Superior National Forest. Aldous, formerly at Albuquerque, expects to devote most of his time in this region to working out methods for the biological control of the snowshoe rabbit.

The biochemical study conducted by Dr. Zeleny to find the changes taking place in white pine seed in storage under various conditions of moisture and temperature, shows that moist storage causes a considerable increase in stored sugar content. What becomes of this and the other food substances will be determined by making chemical analyses of germinating seedlings. Definite information is anticipated that will be of great value, not only to the forester but also to the plant physiologist.

Great interest has been aroused in Iron County, Michigan, by the browning and death of Norway pines planted along certain county highways. Investigation showed that in all cases where this occurred the highways had been treated with calcium chloride during last summer's drought. Samples of dying needles sent in by the Highway Commissioner were examined by Shirley. Although no large amounts of the salt were found present, the needles bore every indication of having been desiccated by particles of this material mixed in with dust. The Commissioner stated that its use probably would be discontinued as the country is considering an extensive program of roadside planting.

New type estimates have recently been prepared for the forested area of the region. The 58 million acres of forest land are estimated to consist as follows:

Aspen	22 million acres
Oak	9 million acres
Hardwood	9 million acres
Coniferous Swamp	8 million acres
Jack Pine	4 million acres
Hardwood Swamp	2 million acres
Norway Pine	300,000 acres
White Pine	300,000 acres
Non-forested land	4 million acres

Of the area in the aspen type, ten to fifteen per cent might also be classed as non-forested land as it will require planting to bring it to full productivity.

The annual analysis of the water level readings taken throughout the summer in drained swamps at Dukes and at Bena, on the Chippewa National Forest, shows new low levels for both swamps during the past season, -2.50 and -5.25 feet, respectively. While the water table at Dukes was practically back to normal on November 30, with a level of -0.50 feet, that at Bena was 3.75 feet below normal. The slow rate of recovery in the latter swamp was undoubtedly due to the very low amount of precipitation received in the fall. At Chatham, Michigan, near Dukes, the annual precipitation for 1930 was only five inches below normal, the drought breaking in the latter part of August. Such was not the case at Bena, however, the drought being prolonged well into the late fall. Weather records kept at Leech Lake Dam, about eight miles from the Bena swamp, show that of a normal annual precipitation of 26 inches but 15 inches were received last year.

The first remeasurement of the sample plots, located in the Dukes swamp, brings out some interesting effects of drainage. Diameter growth of unsuppressed white cedar, balsam fir, black spruce, and red maple averaged 76 per cent greater since drainage in 1926 on trees within 150 feet of the ditches than on those at a greater distance. Of these species, diameter growth of white cedar was 92 per cent greater, balsam fir 76 per cent, black spruce 67 per cent, and red maple 62 per cent on trees within 150 feet of the ditches than it was on those at a greater distance away. Growth in height, based on the measurements of 225 black spruce and balsam fir saplings, was also increased by drainage.

Black spruce and balsam fir, within one chain of the interior ditch, show average increases in height of 87 per cent and 75 per cent since drainage.

No growth measurements have yet been worked up for the Bena swamp. An interesting effect of drainage there, however, is that it has apparently increased the amount of reproduction coming in. An analysis of the 1930 reproduction counts shows that black spruce seedlings, within 75 feet of the drainage ditches, have increased 500 per acre since drainage in 1927. At a greater distance, there has been an increase of only 40 per acre, and in the undrained check swamp there has been no change at all. Other species show a slight increase after drainage and a decrease in the undrained swamp.

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NORTHEASTERN FOREST EXPERIMENT STATION

Behre attended the annual meeting of the directors of the agricultural experiment stations of the twelve Northeastern states in New York and presented a committee report on the Forestry Situation in the Northeast. Forbes of the Allegheny station also participated in this meeting. Interest in coordinating more effectually the work of the agricultural stations and the forest experiment stations was shown and the forestry committee was asked to prepare a summary statement of the projects in forestry now under way at the various institutions. The committee was also asked to consider the desirability of a regional conference on forestry and land use in the near future.

Behre spent a week in Washington considering the organization of the new projects which will start this summer and in discussing the station program and plans with the Washington staff. Since returning from Washington Behre has devoted almost his entire time to the extensive revision of the Capper Report. Effort has thus ^{been} confined to the State of Massachusetts and realization of the magnitude of the task grows as work is tackled. The assistance of other members of the staff will be needed to complete the job this spring and the undertaking is bound to interfere seriously with the progress of regular project work.

Westveld spent most of the month in working up field data collected in connection with his girdling of hardwoods project. In his capacity as a member of the Improvement of Stands Committee of the New England Section of the Society of American Foresters, he and E. S. Bryant established a sample plot in northern Vermont. This plot was established to determine the effect on the growth rate of the released spruce following the girdling of hardwoods.

Stickel spent the greater part of the month on his Fire Weather Report for the Cranberry Lake Station. The manuscript will shortly be in the hands of the printer.

Spaulding got together most of the equipment needed for culturing wood-rotting fungi. Identification of fungi and correlation of accumulated notes and data with brief trips to New Haven and Boston for data and ideas on laboratory equipment were the principal activities of the month.

Miller selected several areas on which he expects to concentrate his biological investigations during the coming field season. The areas are located near Amherst and on the Harvard Forest at Petersham.

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NORTHERN ROCKY MOUNTAIN FOREST EXPERIMENT STATION

The coding of 12,062 fire reports was completed in March, one week ahead of the schedule established when the work was started. Adherence to this schedule, however, required more men detailed to the work than was originally planned. According to the estimates and records by the men engaged in this work two men working together averaged about 90 to 100 coded reports each day after the first week. It took about a week for the men to reduce the work to a systematic procedure.

The character of the original reports was found to be one of the most important factors determining both the speed with which this work could be done and the value of the coded data. Incomplete and inaccurate reports required from two to ten times the effort needed for a good report. Obvious inaccuracies and contradictory statements on the original 929's required checking to obtain usable data or elimination of the item in question, hence the loss of that basic data. Large fires, with acreage burned in several timber types, and lack of statements of these acreages by types, also added very materially to this coding work. It is believed that everyone of the twenty-one men who helped on this coding returned to his Forest with both a better knowledge of the character of reports needed and a firm conviction to see to it that better reports are submitted in the future.

One of the most frequent comments made by these men emphasized the importance of classifying, recognizing, and reporting both timber and fuel types more accurately in the future. The mere process of coding the fire reports convinced practically all of these men that fire behavior varies decidedly by timber types, and by fuel types within each timber type. The possibility of determining strength and speed of attack for each type was obvious, and several men expressed their decision that as soon as they can do it they intend to reclassify their areas on the basis of fuel types within each timber type.

It is believed that we now have at least 21 men on our so-called fire forests who have a keen personal interest in the analysis of the fire records. Consequently these men - and of course many others - can be depended upon to take a marked personal interest in the application of results of this study and to submit constructive suggestions for improving both the collection of data and the analysis. It has been a real pleasure and benefit to all of us on the Experiment Station staff to have worked with these men on this important Regional problem.

Weidman and Gisborne attended the meeting of the Western Forestry and Conservation Association at Spokane, March 19, 20, and 21. Weidman made a talk at the combined luncheon of the Spokane Hoo-Hoo Club and the Western Forestry Association on what the Northern Rocky Mountain Forest

Experiment Station is doing and should do in the Inland Empire. The meeting gave Gisborne an opportunity to discuss the hour control study with Kotok, Price, Munger, Brundage, McArdle and others, and to obtain considerable valuable information and advice.

Cooperation with the Weather Bureau also benefited by the large attendance of Bureau men present at the Western Forestry meeting. District Forecasters Bowie and Sherier, Section Directors Summers, Wells, and Norquest, and fire weather specialists Keyser, Crombie, Dague and Melin were in attendance. Complete agreements were reached on all matters discussed with this group and it was the consensus of opinion that improvement in the fire weather forecasts should be even more rapid during the next few years than it has been during the past. The methods most apt to contribute to rapid progress now seem to be quite well recognized and in use.

Haig was occupied during March entirely with the compilation of material and the writing up of results. Among the reports prepared was a draft of the annual investigative report, a progress report on the phenology project, and a short article entitled, "The Stocked-Quadrat Method of Sampling Reproduction Stands," which was submitted to the Journal of Forestry.

The phenology project is now on a firm basis with 26 observers reporting phenological events at some 35 stations scattered throughout the forested portions of Montana and northern Idaho. The majority of the observers are turning in high class records based on systematic and careful observations and the study will unquestionably contribute a great deal to this phase of botanical knowledge. The progress report, discussing the character and results of the first three years effort, is now being sent to all observers together with a set of revised forms for recording the field observations.

Temporary Assistant Fisher spent the month almost entirely in compiling the reproduction records obtained in our transect study of cut-over areas. This phase of the work is now complete and reproduction data on some 32 cut-over areas are ready for analysis as soon as Haig can find time for it. The records show for each sale area the amount, and species of the reproduction stand, its age and size, and the conditions under which it is found. A report covering this phase will be sent to the field as soon as the proper analysis and write-up can be made. The data on the growth and character of the residual stand on these cut-over areas is also partially compiled and Fisher is now beginning the tabulations necessary to complete this phase. Both of these studies will furnish a great deal of information of value to western white pine timber sale practice.

Thompson reported steady progress during March on the emergency construction work at the Priest River Branch, in spite of much rainy weather and the practically impassable conditions of the roads for hauling lumber and supplies. Fence posts were made and set for nearly two miles of fencing, major repair jobs were practically completed on two buildings. Work was also accomplished on the septic disposal system

and on a new structure to be used as a garage and housing for the wagon, plows, fresno, road drag and other equipment. Eight men worked 160 days and were paid a total of \$635. The earnings of these men support thirty-two dependents. It is planned to have about fifteen men on the job in April and May. This contribution to relief of unemployment is very much appreciated in the Priest River Valley.

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PACIFIC NORTHWEST FOREST EXPERIMENT STATION

General

The most important event of the month to the Station was the decision to merge the Products office of Region 6 with the Station, effective April 1. This arrangement mutually agreed to by Regional Forester Buck and Director Munger is coincident with the promotion to a position in the Branch of Research in Washington of Mr. W. H. Gibbons, who for many years has been Chief of the Section. The Products force will move to the Lewis Building as soon as space can be obtained there. It is expected that this new arrangement will promote closer correlation of the Products work with other activities of the Station and thereby be mutually beneficial.

March was characterized by two important meetings which took considerable time of several of the office both in attendance and in preparation therefor. On March 3 and 4 was held a very successful session of the Investigative Committee over which Regional Forester C. J. Buck presided. The report of the Committee was completed before the end of the month and then had to be mimeographed for general distribution. The annual meeting of the Western Forestry and Conservation Association was held in Spokane March 19 to 21, and the Station was represented by Munger, Brandstrom, Shepard, and McArdle. Brandstrom gave a paper on selective appraisal in Douglas fir logging operations. Shepard spoke on rating forest properties for insurance purposes, and McArdle told of the analysis which he is making of the influence of speed of attack, or "hour control", on fire control.

Three radio addresses for the NBC Farm and Home Hour Broadcasts of the U.S.D.A. have been prepared by members of the Station, "The Forest Survey" by H. J. Andrews, "How Fast Do Douglas Fir Forests Grow" by R. E. McArdle, and "Timber Growing and Logging Practice in the Douglas Fir Region" by Thornton T. Munger.

The Station has been cooperating with the Portland Park Superintendent in initiating plans for developing the Portland Municipal Arboretum and in securing seed and stock therefor. A crew of about 100

"unemployed" have been putting the tract in shape, this winter, for planting. One Sunday this month, Kolbe and Munger accompanied three of the City officials, the consulting landscape architect, Mr. Duncan, and Mr. Sinclair Wilson in a tour over the area.

During the last days of March, the Station had on its payroll its maximum number of employees to date, 46 - not including 3 temporary laborers, 2 draftsmen employed from cooperative funds, 15 national forest officers engaged on the forest survey, 2 national forest officers on detail for fire studies, and the 5 Products people soon to join the Station,

Other Stations may be interested in our experience with the expense of operating our motor fleet. The following figures are for the calendar year 1930 and do not include forest officers' time.

Make	Calendar year, 1930				Total to date	
	:Num-ber :	Miles	:Gal.	Gas:Cost per mi.:	Miles	:Cost per mi.
Dodge touring	21	6,961	450	\$.037	50,238	\$.037
Ford "T" truck	88	4,080	272	.024	30,937	.030
Dodge delivery	111	8,340	576	.047	29,008	.040
Ford "A" delivery	48	8,988	505	.022	8,988	.022
Ford "A" sedan	195	14,560	866	.028	20,277	.028
Ford "A" delivery	224	8,255	493	.026	8,255	.026
Ford "A" sedan	225	12,581	760	.022	12,581	.022
Ford "A" delivery	283	4,791	242	.022	4,791	.022
Ford "A" delivery	284	5,473	345	.029	5,473	.029
Ford "A" sedan	285	564	35	.104	564	.104

Economic Selective Appraisal in Douglas Fir Logging

Brandstrom has put in the field 2 additional crews to make time studies of typical logging operations, making 3 crews altogether. They are at present working at the camps of the Chas. R. McCormick Lumber Company and the Simpson Logging Company, both on Hoods Canal, Washington. One crew is studying caterpillar operation, which is still somewhat of a novelty in big Douglas fir. Steps are being taken to conduct some mill scale studies in Douglas fir mills as a necessary adjunct to this study. Munger made a trip to Seattle during which he, Kirkland, and Brandstrom conferred with Colonel Greeley, C. A. Lyford, and others with a view to getting the cooperation of the industry and agreeing upon a technic that would be both useful to this study and to the industry.

Forest Survey

Arrangements have been completed whereby every national forest in the Douglas fir region now has at least one man working on the survey. With Haefner transferring to the Santiam after completing the Siskiyou, and Kirkpatrick, who has finished the Rainier, going to the Snoqualmie

to work with Briem, the two forests on which no work had been done to date are now being taken care of.

A tentative working plan for the growth phase has been drawn up. Sources of information on the various forms of depletion in the region have been canvassed preparatory to writing the depletion phase working plan. Instructions and forms for the compilation procedure on the inventory phase have been prepared. During the latter part of the month two additional crews were started on the stripping of Lewis County.

Governor Meier of Oregon vetoed the bill appropriating \$5,000 for State cooperation on the survey, as an evidence of his economy program.

Forest Insurance

During March the collection of intensive fire loss data through the cooperation of state and association wardens by means of supplementary reports for fires over 50 acres in size was completed in Oregon with the exception of the Clackamas-Marion district. The same work for Washington, west of the Cascades, was brought very nearly to completion during March. It is expected that the completed reports for this portion of the Douglas fir region will be received within a week or ten days.

The field crew making detailed studies of fire losses on the ground has practically completed Cowlitz County which had a large burned area.

Routine work was mainly directed toward the development of the part of the working plan having to do with the statistical analysis of the fire reports, particularly the improved supplementary reports from which a great deal of factorable data will be obtainable.

Western Yellow Pine Growth and Yield

Interest in the existence and trend of climatic cycles is continually growing stronger in this region, especially among the power people. The continuation of the present dry cycle, which has now already lasted about 14 years, is a vital factor in the decision to build or not to build greater water storage basins. A start has been made in a closely allied question, namely, in the cyclic variations of tree growth, incidental to the western yellow pine growth study. It is essential to know whether the slow growth of the past decade or two is a subnormal condition, which will unduly warp growth calculations, or whether it is normal insofar as it reoccurs at repeated intervals. In order to throw some light on this question, the annual radial growth of ten trees on each of 24 areas in different parts of Oregon and Washington was measured and average diameter increment curves drawn for each area. These now await further analysis.

The core-measuring device constructed by the Bureau of Entomology greatly facilitated the work and proved to be the handiest instrument yet devised.

The final steps are now being taken in the growth alignment charts for western yellow pine. The charts themselves take site quality, years since cutting, size of the reserve stand into account. Adjustments to the predicted gross yield as read from the charts must be made for mortality and for composition of the stand. By composition is meant the percentage of trees in the vigorous growing classes, such as classes 1 and 3 of Dunning's system. Still further checks will be made approaching the problem from the entirely different slant of individual tree growth in order to determine whether the method of plot growth is as good as we think it.

Methods of Cutting Western Yellow Pine

With the assistance of a computer, Kolbe completed the bulk of the computations necessary in the preparation of progress reports on five of the Crater methods of cutting plots. Volume determinations and other computational work are yet to be done on the two extensive plots in central Oregon. These two plots total eighty-two acres and contain 2831 trees in the reserve stand. These plots are laid out in strip form and are especially adapted to the application of mill scale studies, in determining the effect of different methods of marking in certain stands. It is the plan to use them for this purpose as well as to check windfall losses and similar data obtained on the smaller plots in the same locality.

Fire Studies

Four more men on detail to the Station in connection with the analysis of time factors in fire control either arrived or departed during the month. At present analysis for the Deschutes, Whitman, and east side of the Rainier Forests are under way. As soon as analyses for these forests and for the Wallowa are completed, the data for groups of the east side forests will be combined and a report written to cover the winter's work. No changes have been found necessary in the working plan recently prepared.

McArdle devoted much of his time during the month to routine Investigative Committee work, preparing material for the meeting or assisting in compiling the Committee report for publication. He also is serving on the subcommittee handling the minor studies projects assigned to the forests.

Douglas Fir Natural Reproduction Studies

The report on the measurement of factors influencing natural reproduction has progressed far enough to indicate that surface soil temperature is the factor that is singly responsible for the greatest seedling loss. Maximum soil temperatures that are fatal to tender seedlings (120° F. or over) may be expected to develop in complete exposure with air temperatures of 75 or above and during the past 3 years large numbers of seedlings on the sample plots were lost from heat injury. In the past minimum temperatures were given little attention and not thought of as a seedling enemy except when the air temperature dropped below freezing. But our records indicate that surface soil minimum temperatures under complete exposure in the upper Wind River valley averaged 4° below the air when the air temperature was between 30° and 40° and that injury may take place when the air temperature is well above freezing. Minimum surface temperatures under a brush cover (shade) were found to average 4° above the air.

Wind River Branch

A small slice of the deficiency appropriation has made possible some much needed improvement work in the arboretum and repair on buildings at the Wind River Branch Station. They include singling the roofs of the office and one residence, treating the office walls to a sheathing of plywood, widening the fire line, and grubbing willows and vinemaple out of the arboretum. Simson has made two trips to Wind River to supervise this work.

Munger, Isaac, Kolbe and Simson managed to get most of the spring arboretum planting and transplanting done before being halted by a snow-fall of 16 inches. Kolbe and Simson will complete the job as soon as weather permits.

Forest Products

General

The section of Forest Products, which since the establishment of the Regional Office at Portland, Oregon in 1908 has been a unit of that office, has combined with the Pacific Northwest Forest Experiment Station, effective April 1. This arrangement, mutually agreed to by the Regional Office and the Experiment Station, is in line with the policy of consolidating all the research activities of each region at the experiment stations. The Products office will move to the Lewis Building as soon as space can be obtained there. It is expected that this new arrangement will facilitate correlation of the Products work with other activities of the Station such

as the forest survey, fire damage studies, slash disposal, methods of cutting studies, selective logging and other economic projects, and that the products, the silvicultural, and all the economic research will benefit thereby. Mr. Gibbons, who has been in charge of the Office of Products since February 27, 1919, is being promoted to a position in the Branch of Research in Washington, D. C. effective May 1.

Felling and Bucking in the Douglas Fir Region

Rapraeger continued with the compilation of data resulting from the field work accomplished by Spelman and Johnson last summer and fall. Just now the time study phase of the felling and bucking study is being given consideration. A little later the breakage and the mechanics phases will be analyzed. Rapraeger is being assisted in the computations by Stephen F. Roise who has been temporarily employed.

Survey of Sawmill Waste in the Douglas Fir Region

Progress on the office work in connection with this project was delayed somewhat, due to the demand of office administrative matters which, because of Gibbons' absence in Washington, D. C. required a considerable portion of Hodgson's time. About one-half of his time during the month was devoted to the survey.

Most of the tabulations, representing the results of the study and which will be used in the final report, are now prepared in preliminary form. The text of that part of the report to deal with the findings of the survey will be largely worked around the explanation of these tables.

Conversion Factors Relating to Sawmill Waste

Soon after the survey of sawmill waste was initiated, the almost total lack of suitable conversion factors became apparent. It was necessary to establish a set of standard ratios applicable to sawmill waste and to products made from it for use in expressing the findings of the study. The results of Hodgson's research along this line are to constitute a chapter in his office report dealing with the survey, but in order to furnish the information in a form suitable for easy reference he has compiled these data into a separate report under the title "Conversion Factors Relating to Sawmill Waste and to Products Made From It in the Douglas Fir Region of Western Oregon and Washington." Copies of this report have been sent to the Forester, the Forest Products Laboratory and to the Pacific Northwest Forest Experiment Station.

Use of Hugged Fuel and Sawdust

In connection with the survey of sawmill waste in the Douglas fir region, a study of the production and use of hugged fuel and sawdust has

recently been completed by Hodgson and Rapraeger. This study has brought out that during the year 1929 the sawmills of western Oregon and Washington produced and disposed of about four and one-quarter million units (1 unit = 200 cu. ft.) of hogged fuel and sawdust. Assuming that the heat value of hogged fuel and sawdust is equal to that of $2\frac{1}{4}$ barrels of crude oil, the quantity of these materials used for fuel would be equivalent to 9,650,312 barrels of crude oil.

The principal users of hogged fuel and sawdust are sawmills, pulp and paper mills and electric power companies. The following table shows the distribution of use of these commodities within the region studied.

	: Western Washington :		: Western Oregon :		: Total for Western Oregon & Wash. :	
	: Number: :		: Number: :		: Number: :	
	: of : :		: of : :		: of : :	
Classes of Consumers :	Users :	Consumption :	Users :	Consumption :	Users :	Consumption :
		Units		Units		Units
Sawmills	356	1,269,314	450	711,817	806	1,981,131
Pulp & Paper Co's	14	923,661	6	142,044	20	1,065,705
Power Companies	2	195,914	8	456,662	10	652,576
Apts. & Office Bldgs.	150	81,308	65	11,000	215	92,308
Schools and Public Buildings	51	54,000	83	32,478	134	86,478
Residences	5,213	77,915	6,780	65,800	11,993	143,715
Other Users	68	173,998	80	93,151	148	267,149
Total Consumption	..	2,776,110	..	1,512,952	..	4,289,062
Total Production	..	2,778,940	..	1,510,122	..	4,289,062

Residence sawdust burners are a development of recent years. There are now 6,272 such burners in Portland alone and 3,800 in Seattle. The column for "other users" in the table includes laundries, milk condenseries, packing companies and creosoting plants. Laundries and milk condenseries favor hogged wood as a fuel because of its thermal properties, availability at low cost, and cleanliness.

Minor Forest Products Study

Johnson spent some time in both the field and office on this project. In this connection, practically complete information has now been secured relative to the production of cascara bark. In 1930 the total reported production of this bark, in Oregon and Washington amounted to 3,691,000 pounds of dry bark. Slightly more than 50 per cent of this was produced in Washington. All bark was purchased f.o.b. shipping point. Early in

the season peelers received 8 cents per pound for dry bark; but as the season advanced and the amount of bark offered increased, the price dropped to 4 and 5 cents per pound. The production of bark this year has been greater than for a number of years past, due, no doubt, to the scarcity of other work.

1930 Census of Lumber, Lath and Shingles

A large portion of Mr. Johnson's time was devoted to this project. During the month 511 schedules were edited and are now ready to forward to Washington as soon as the data are entered on the permanent record cards. Considerable correspondence was necessary to secure additional information from companies submitting incomplete schedules. About a week was spent in the field picking up companies from whom no reply had been received.

Third requests were sent to 478 companies in Oregon and 450 in Washington. In Oregon there are 200 companies who have not reported and in Washington 273. To date 543 schedules have been forwarded to Washington, D. C.

Addresses

At a recent meeting of the North Pacific Section of the Society of American Foresters, Hodgson gave a talk entitled "Some Facts About Sawmill Waste in the Douglas Fir Region." The tentative findings of the survey of sawmill waste were referred to. The major uses of sawmill waste were mentioned, with quantities and values illustrated on charts, and then a number of the unusual uses, supported by samples of unusual by-products made from sawmill waste, were discussed.

At the request of Public Relations, Mr. Hodgson prepared a five-minute talk entitled "Saving the Forest Waste" for use of the Western Farm and Home program of the U. S. Department of Agriculture broadcasting series to be given from the National Broadcasting Studio at San Francisco. The talk mentioned the high-lights of the Hodgson report on "Logging Waste in the Douglas Fir Region."

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SOUTHERN FOREST EXPERIMENT STATION

General

M. M. Lehrbas was transferred from acquisition work in Region 7 to the Southern Station on March 16, as Assistant Forest Economist, and assigned to the Hardwood Survey. His experience during the last year,

when he was in charge of a field crew studying forest conditions in the proposed floodways in the Mississippi valley, will prove of great value to the Hardwood Survey project.

During the early part of the month, Demmon joined the naval stores extensive survey crew in southern Georgia, and also visited Jacksonville and Starke, Florida, planning future naval stores work. Demmon also went to Asheville, North Carolina, for a conference with W. H. Gibbons and members of the Appalachian Station regarding the Extensive Revision of the Capper Report.

Management

Wahlenberg, Chapman, and Olsen spent the first week of March completing preliminary surveys of two proposed experimental forest areas on the Ouachita National Forest. One of these areas is quite typical of the region, and appears to be satisfactory for an experimental forest. The other has certain areas with excellent reproduction and young growth, which are not found on the first area. However, both of these areas can easily be worked from one headquarters, and it may prove desirable to include parts of both in an experimental forest. Detailed data taken on each tract were worked up during the month, at New Orleans.

A series of thinning plots in longleaf were established on the Superior Pine Products Company holdings near Fargo, Georgia, and time studies of the cost of thinning were made.

Forestation

Wakeley set up germination tests of seed of the four southern pines, and also sowed seed of these pines and promising exotics in the beds at the city nursery. With L. S. Gross of Region 7, he spent four days on the Ozark National Forest in Arkansas, looking over the nursery and plantations and planting sites. About 15,000 acres of old fields will require planting on this forest. The last part of the month was spent in annual remeasurement of experimental plantations at Bogalusa.

Gemmer, at Camp Pinchot, direct-seeded two one-eighth acre plots to longleaf pine, using a one-man drill machine. One plot was burned in December, 1930, and the other has not been burned since 1924. Seeds of exotics were planted in the Camp Pinchot nursery.

Recounts of various plantations were made. Nineteen-thirty plantings show a good catch, Pinus sonderreggeri looking especially well. Rabbit damage is quite noticeable.

Naval Stores

Regular chipping was started on all groups, including the new Interval of Chipping tests and the advance streak groups. Four French faces were also started, which will be chipped six times a week at Kingsley.

Averell, Hayward and Busch were on extensive survey work the first half of the month, in southern Georgia. Two locations were found where it was thought possible to lay out tests to determine the effect of annual burning on gum yield. The unburned plot on one of these locations caught fire the day before the crew was to start work. The other location at Nashville, Georgia, may give some figures which will be of value, since Mr. Norman, the operator, has four crops of cups on unburned land and some ten or twelve crops on land which is burned annually.

Hayward took a trip with Barnette to Winter Haven to collect soils and litter, and spent the most of the last half of the month writing up the report of the extensive survey trip.

Wyman took a five-day trip down the east coast across the Tamiami Trail and up the west coast for the purpose of getting information on the timber conditions in the south part of the state.

Diller finished checking over the identification of herbarium material on hand, and prepared a card index by families and species of all specimens now in our collection. He left the last part of the month for an assignment with Gemmer at Camp Pinchot.

Wyman made a final check of the Naval Stores manuscript and sent it to Washington. The question of preparing material for the Naval Stores Handbook was discussed with Miss Gerry and an outline was drawn up covering the points to be handled by Wyman.

Erosion

Meginnis and Sinclair spent the first week of March in the office, making plans for gully control planting in Mississippi. Seven areas of about one acre each had previously been selected in the field, in locations representative of the various soil, substrate, and climatic conditions occurring in the region. These plantings are being made to determine what tree species will grow on badly gullied areas and which will be most effective in controlling erosion.

Sinclair, Meginnis and Coile spent the last three weeks of March on the actual planting work. About 1,500 trees were planted on each of four gullied areas located near Natchez and Meadville, in the southern part of the region, and near Hernando and Holly Springs, in northwestern Mississippi. The areas at Natchez and Holly Springs were established on State Agricultural Experiment Station property.

Planting stock was obtained from Region 7 of the United States Forest Service and from the Louisiana Division of Forestry. The following species have been used:

1. Loblolly pine
2. Shortleaf pine
3. Slash pine
4. Black locust
5. Red River oak
6. Red oak
7. Bur oak
8. Sycamore
9. Red gum

On slightly eroded areas, an attempt was made to space the stock from five feet to six feet apart in rows running diagonally across the main slopes or small gullies. Where gullies were large, it was necessary to plant the stock wherever a suitable place could be found in and around the gully banks.

Financial Aspects of Private Forestry

Dr. Ziegler revised rough drafts of reports on Bradford, Hamilton and Osceola Counties, of Florida. He also directed the Extensive Revision of the Capper Report, on which Spillers spent practically the entire month. Bond and Reynolds went to Hempstead County, Arkansas, early in the month, and classified timber stands and open lands by means of a cropmeter. This trip was made for the purpose of obtaining additional information needed to complete the Hempstead County report.

Hardwoods

Winters and Bull spent the first part of the month in obtaining measurements of volumes of hardwoods for volume tables. The remainder was spent in the field, working with the Hardwood Survey crew.

Hardwood Survey

The Survey crew spent most of the month in the office, completing the working plan for the Hardwood Survey, preparing preliminary volume tables, and making detailed preparations for field work. Winters worked up a plan for office computations of the field data in which punch cards will be used for sorting and tabulating.

The first actual field work of the Hardwood Survey was begun March 27, starting to run strip survey at the levee near Milliken, East Carroll.

Parish in northern Louisiana. East and West Carroll Parishes are to be covered by strips three miles apart, and sample plots are taken every ten chains. A three-man crew can cover about three miles in a day. Aerial photographs and a preliminary topographic map are available for these parishes, obtained from the District Engineer office.

It has been found possible to distinguish cut-over, second-growth, and brush areas and open farm lands from the photographs, but it has not yet been possible to pick out various hardwood types. Probably the greatest value of the photographs lies in planning the work, as roads, water courses, and other features can be anticipated in advance.

Forest Pathology

Siggers planted a small area at Bogalusa to longleaf pine, for use in determining minimum number of seasonal sprayings necessary to control brown spot needle blight. The third annual estimate of amount of this disease was made on five plots. An appreciable reduction in the total amount of disease as compared to last year was found, and is attributed to the very dry season of 1930.

Lindgren gave a paper on sap stain prevention before the Southern Pine Association at their annual meeting in New Orleans during March. Scheffer put in a series of small scale tests for the prevention of sap stain in southern pine and hardwoods in Jasper, Texas.

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SOUTHWESTERN FOREST AND RANGE EXPERIMENT STATION

The field season is on. Most of our energies are now being bent toward completing improvement work under emergency appropriations calling for expenditure before July 1. Cooperrider has a man-sized job installing catchment basins and erecting buildings for use in the erosion project. Culley and Canfield are building houses and miles of road on the Santa Rita and Jornada. Culley is also installing a water system to supply the range station and a new physical factor station which he is establishing in cooperation with the University. It is a little too early for improvement in the yellow pine type, but arrangements are being made to add three houses and enlarge the water system at Fort Valley.

Substantial allotment increases have been announced for erosion and range investigations, and even forest research came in for a small share. With these increases, together with a generous contribution from the Regional office, business should soon be picking up at the old Southwestern.

In Forest Management, considerable time has been given to compiling growth data for the "extensive revision," and also to final touches on the timber growing and logging practice report which has finally been submitted to the Forester. Other reports completed during the month are a writeup on the Station for the Arizona Year Book and an article entitled "Recovery of Western Yellow Pine Seedlings Injured by Grazing Animals" for the Journal of Forestry.

Members of the station greatly enjoyed visits from Major John D. Guthrie, an old R-3 man, and Will C. Barnes. Mr. Barnes spent about two weeks at the University gathering data for his new book on the origin of place names in Arizona.

Jornada Experimental Range

Cattle are in good condition and the ranchers are optimistic. Low death losses, relatively small feed bills and the likelihood of good calf crops give promise of a profitable year in spite of the anticipated lower prices.

The Jornada-Las Cruces road was completed and the crew started reconstruction of the Ropes Spring Road.

Bomberger completed the first draft of his report on the competition between black grama and snakeweed. His conclusions are as follows:

1. Under favorable climatic conditions and properly regulated grazing use, black grama (Bouteloua eriopoda) will increase in density in spite of the competition from snakeweed (Gutierrezia juncea.)
2. A certain amount of snakeweed may be expected in a black grama type even after the grass has attained its maximum density.
3. Heavy snakeweed invasions occur only after the range is depleted by overutilization or by extended drought. A combination of those two factors will also bring about conditions which permit an increase in snakeweed.

Canfield's time was devoted to routine administrative duties and the writing of reports. A manuscript entitled "Solid Stems in Certain Jornada Experimental Range Grasses" was submitted in the latter part of this month.

Mr. John D. Jones of the R.O. was a welcome visitor on February 27.

Santa Rita Experimental Range

Emergency Employment

Emergency road construction, under the direction of W. V. Turner, has been progressing rapidly and to date approximately twelve miles of existing roads have been graded and improved, and four miles of new construction accomplished on the Santa Rita High Line road (formerly the proposed Foothill road.) The latter road provides a short cut to the Physical Factor Station, reducing the distance from four and a half miles to two miles. Considerable unforeseen work was encountered over a half mile stretch of this when removal of the surface soil revealed a heavy clay that necessitated a complete job of surfacing in order to provide a satisfactory road bed. The new High Line road, in addition to very greatly facilitating future investigative work on the Santa Rita, will provide a real scenic drive overlooking the entire range.

Work on the water development program has been under way for several weeks and Robinson Spring has been developed to the point of doubling its former discharge of water.

Construction work on the Physical Factor Station started during the last days of March and with the exception of the complete water system, the station should be practically completed and ready for operation by April twentieth.

Turner has had a force of about twenty men working and within the next ten days will increase this to about thirty or more.

Spring Range Conditions

Range conditions are excellent at the present moment as a result of an abnormal amount of rainfall during the winter and early spring. Winter rainfall (Oct. - Jan. incl.) totalled 6.44 inches as compared to a thirty year average of 4.93 inches. Early spring rainfall (Feb. and March to date) has totalled approximately 5.60 inches as compared to a thirty year average of 2.48 inches.

February rainfall was the most excessive that has ever been recorded at Florida Station in thirty years of records, totalling 5.44 inches as compared with an average of 1.32 inches and a previous maximum of 4.52 inches recorded in 1905. Early spring temperature conditions have been less favorable for growth than usual, however, green growth of spring annuals and perennial grasses is in evidence everywhere and a few warm days with even a small amount of moisture should produce a good spring growth of forage. Despite rather low temperatures (for southern Arizona) mesquite has already started to leaf out and should be sufficiently far advanced, by the middle of April, to supply an appreciable amount of forage.

RESEARCH ACTIVITY IN REGION 2

The past month witnessed a concentration of effective time by the research organization and co-operating agencies upon the statistical analysis of various mensuration and management studies.

Supervisor Pearce continued with his task of analyzing and co-ordinating the data submitted to date in the regional strip survey growth study on cut-over areas (Me-6), most of his time being given to working with the reports submitted by the Routt and Cochetopa Forests. Considerable correspondence passed between him and the Experiment Station in the effort to re-arrange and revise these reports to make the data suitable for the purpose for which they are to be used. The preliminary reports for the Uncompahgre and Gunnison Forests were submitted to Roeser for approval and substantial progress was made by the Holy Cross and Rio Grande Forests in preparing their respective reports in final form. It is expected that these will be submitted for transmittal to Supervisor Pearce early in April.

The Rio Grande Forest plans to procure sufficient individual tree measurements in the near future to prepare a strictly local Engelmann spruce volume table. To this end, all available measurements on file at the Experiment Station were submitted to the Supervisor for analysis in drawing up a plan of action.

In the Experiment Station office in Colorado Springs, Rangers Smith and Fletcher continued uninterruptedly to compile stand tables and yield data for various management study plots in the spruce type of Colorado. Statistics were computed and assembled for the four Lake Fork and two Sargent's Mesa plots on the Cochetopa Forest and for the four plots established in 1960 on the Montezuma Forest to study the management problem under conditions of pulp-wood utilization. Toward the close of the month, a start was made in tabulating and compiling the management study (M-1) records for individual plots in the Fremont experimental forest. Data have been collected for some sixty plots, and most of these have not, as yet, been transcribed from the field sheets.

Roeser gave most of his time to summarizing the results which have been obtained in the sample plot cutting methods studies in the spruce type, with particular reference to those representing central Colorado conditions on the Cochetopa, Holy Cross and Arapaho Forests. The plan of the original growth study report of 1927 was followed in presenting the data. A report, describing the results from the standpoint of their practical significance, was prepared for each in fulfillment of a scheme to make the information available to the field man as soon as practicable, probably through the medium of technical or research notes.

A brief resume of the results obtained shows net per acre-annum cubic increments ranging from 0 (where natural losses have exceeded the increment of living trees) to 88 cubic feet, with gross increments, indicating the potential productivity of the various sites under different degrees of stocking, running the gamut from 27 to 127 cubic feet, both of which, incidentally, are for quality I sites. The excellent growth possibilities of the spruce-fir type on the best sites on granitic formations are indicated by the 4% return on the original growing stock which is being procured under a condition of moderate cutting on the Lake Fork (old Leadville) plots. These plots, in ten years, have increased in net volume at rates of 260-390 board feet, Scribner measure, per acre-annum.

Perhaps the outstanding lesson for management practice which the various plots have taught is the danger of over-cutting and the concomitant heavy and needless windfall loss which is almost always experienced when too much of the growing stock is removed. The amount of loss seems to bear little relation to the quality of the site. In addition to this menace, perhaps a still more potentially dangerous factor is the one of illegitimate logging damage, which finds expression not so much in terms of wood volume as it does in terms of advance reproduction and sapling growth, whose decimation not only adds many years to the rotation period, but quite often upsets a fairly satisfactory balance of size class distribution.

One of the rather astonishing facts revealed in these spruce cutting studies has been a 58M board foot (Scribner rule) stand on one of the Spruce-lodge Arapaho Forest plots. It is doubtful if many of the rank and file of administrative foresters within the Region are aware that stands of such size are present in the Rocky Mountain area.

The contemplated erosion study trip to Salt Creek in South Park on the Pike Forest was again, of necessity, postponed. It is now definitely planned for in mid-April.

Much of the time of the Regional Office of Management was given to assembling the data necessary for the report due on May 1 in the "RE, Extensive Revision" project.

Activity during April in all of the units engaged in work of investigative nature will continue along the lines pursued in March, or until the opening of the field season, which, according to all indications, will be relatively early.

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MANUSCRIPTS

APPALACHIAN

Arbor Day Talk on Tree Identification. J. H. Buell.

Bird Life in Western North Carolina, T. B. Burleigh.

Pioneers in Forestry at Biltmore, North Carolina, Josephine Laxton (For American Forests.)

IN PRINT

- Day, Ralph K. Protection from Grazing is Essential to the Welfare of the Farm Woods of the Central States. (Proceedings of the First Central States Forestry Congress)
- Demmon, E. L. Forests and Erosion (Lumber Trade Journal, March, 1931)
- Kellogg, L. F. What Species Shall We Plant. (Proceedings of the First Central States Forestry Congress)
- Kotok, E. I. Fire, a Problem in American Forestry. (Scientific Monthly, November, 1930)
- Lentz, G. H. Logging Bottomland Hardwoods with Caterpillar Tractors. (Southern Lumberman, February 1, 1931)
- " " " From Forest to Waste Land. (American Forests, March, 1931.)
- McCarthy, E. F. The Central Hardwood Forests - A Research Task. (Proceedings of the First Central States Forestry Congress).
- Wakeley, P. C. Successful storage of longleaf pine seed. (Jour. Forestry, March, 1931)
- Westveld, M. "Reproduction on Pulpwood Lands in the Northeast." Tech. Bul. 223.
- Zon, Raphael There Never can be too much Forest. (Development Bureau News, March 1, 1931.)

FOREST PRODUCTS - Region 1

Lumber Manufacturing Cost Trip

During the last half of March Mr. Neff, Regional Logging Engineer and M. Bradner personally visited the headquarters offices of nineteen of the lumber companies in north Idaho and eastern Washington and obtained lumber manufacturing costs of their band mills.

A number of the plants visited had started up during the month and were running one shift. A few mills had been in operation since early in the year and others were still idle. Present indications were that the cut of all species during 1931 would be less than for 1930. In some mills Idaho white pine logs were being cut exclusively and it is probable that the production for this species will be as high if not higher than in the previous year. Some western yellow pine is being cut but only enough of the mixed species to fill orders. The stocks on hand are, in general, higher than they were a year ago.

Ten identical North Idaho mills produced 10.2% less lumber in 1930 than in 1929. Only 2 of the 10 mills had a lower 1930 manufacturing cost. Lumber manufacturing costs, in general, averaged \$1.16 per M higher in 1930, being entirely due to curtailed production.

Five identical eastern Washington mills cut 17.2% less lumber in 1930 than in 1929. The cost of production averaged 79 cents per M more in 1930 than in 1929. Four identical western Montana mills produced 26.3% less lumber at a cost of 62¢ per M higher in 1930 than in 1929.

Quite a number of the companies have reduced wages about 10 per cent. Even with this reduction in the cost of manufacture, it is doubtful if the mills producing western yellow pine and mixed species have broken even.

The collection of costs from western Montana mills will be completed early in April.

Census

Second requests were mailed to 174 delinquents in North Idaho and Montana with a circular letter dated March 16. A good response was made to this follow-up and at the present time there are not more than 75 concerns in Region One from which returns must be secured. However, at least half of the operators who have not reported are those who have caused delay in past years and considerable clean-up work, including quite a number of personal interviews, will be necessary before the canvass can be closed. The editing and preliminary tabulation of all accumulated schedules will be completed as soon as possible. It is expected that about 350 complete returns including reports from most of the large mills will be forwarded to Washington within the next ten days.

Service Tests of Poles

The latest inspection records for seven of the service tests in this region were compiled and transmitted to the Forest Products Laboratory during the month. Additional work in order to furnish records desired by the Laboratory for use in a proposed new paper on the service tests of poles included a field inspection of butt-creosoted lodgepole pine poles near Dillon and near Rocker, Montana, on March 23-24, also partial preparation of a report on untreated western red cedar electrification poles placed in the C.M.St.P. & P. trolley and transmission lines from Harlowton, Montana, to Avery, Idaho, in 1915-1916.

The stability of creosoted lodgepole pine when used for telephone poles or stubs has been quite clearly demonstrated in some of the above tests. One hundred and ninety-two butt-treated poles placed in the Dillon-Rattlesnake Creek eleven years ago are all sound and no replacements have been required. A few poles which the Anaconda Copper Mining Company treated and placed near Rocker, Montana, in 1912, are still sound and in good condition after 19 years of service. Similar experiments near Choteau, Montana, where 550 butt-creosoted lodgepole pine pole stubs were set in 1917, have also proved successful, all of the stubs being in practically as good condition as when they were originally set.

Wood Waste Survey

The results of the survey in the white pine type have been forwarded to The Timberman for publication. Office work for the yellow pine type has been practically completed and will be published in the May Timberman.

Stumpage Prices

Ranger Stanley Lukens, a technically trained forester, was detailed to this project and worked under Mr. Anderson's supervision for about two months. All stumpage prices, including 1930 prices, as far back as any record exists (1912) were compiled. Prices were grouped, summarized and averaged by years, by species, for each of the following agencies: U. S. Forest Service, U. S. Indian Service, Idaho sales from state lands, Montana sales from state lands, Montana mills and Idaho mills. A species summary of all six agencies combined was also made to obtain the average price per M for each species for the entire region.

There follows the 1928 yearly summary of stumpage prices of all agencies for the entire Region. This is indicative of the results of this project.

S p e c i e s	P o l e s			Saw Timber:All Saw Timber Basis:					
	:25' & Less : 30' & Over:		Total:	Value:	Total	:	Value	:	Value
	Total:	Value:	Total:	Value:	Volume per	:	Volume	:	per
	: Lin.:	per	: Lin.:	Per	: MFeet:	MFeet:	M Feet	:	M Feet
	: Feet :	foot:	Feet :	Foot :	B.M. :	B.M.:	B.M.	:	B.M.
W.W.Pine (1)	:	:	:	:	:	:	:	:	:
"(Dead)	:	:	:	:	:	:	:	:	:
Yellow Pine	:	:	:	:	:	:	:	:	:
Larch-D.Fir	:	:	:	:	:	:	:	:	:
Cedar	:440,250:	.0038:	577,508:	.0259:	4,192:	.644	:16,245	:	6.13
Spruce	:	:	:	:	:	:	:6,043	:	1.45
Mixed (2)	:	:	:	:	:	:	:54,730	:	.816
Lodgepole	:	:	:	:	:3,905:	2.96	:3,905	:	2.96
D.Fir(East)	: (3)	:	:	:	:	:	:	:	:
Total	:	:	:	:	:	:	:813,805	:	1.89
Cordwood	:	:	:	:	:	:	:	:	: 550 : .50

- (1) Western (Idaho) white pine
- (2) Includes white fir, Douglas fir, hemlock, cedar, and lodgepole pine usually sold as mixed in the western white pine type.
- (3) Rocky Mountain Douglas fir sold adjacent to or east of the Continental Divide in Montana. Volumes and average values for those species sold as lagging, props and ties are also tabulated separately for those years that such sales are made.

Lumber Prices & Movement

Av. Mill-Run Prices

	Annual 1930	Annual 1931	January 1931	February 1931
Idaho White Pine	\$54.33	\$53.56	\$31.50	\$31.83
Western Yellow Pine	26.19	21.64	17.56	19.73
Larch-Fir	20.29	17.32	14.50	13.34
White Fir	20.94	16.34	13.87	13.86
Spruce	24.23	21.93	18.50	17.18

Shipments and Cut

	<u>1930</u>	<u>1931</u>
Shipments	113,714	83,883
Cut	94,562	51,457

